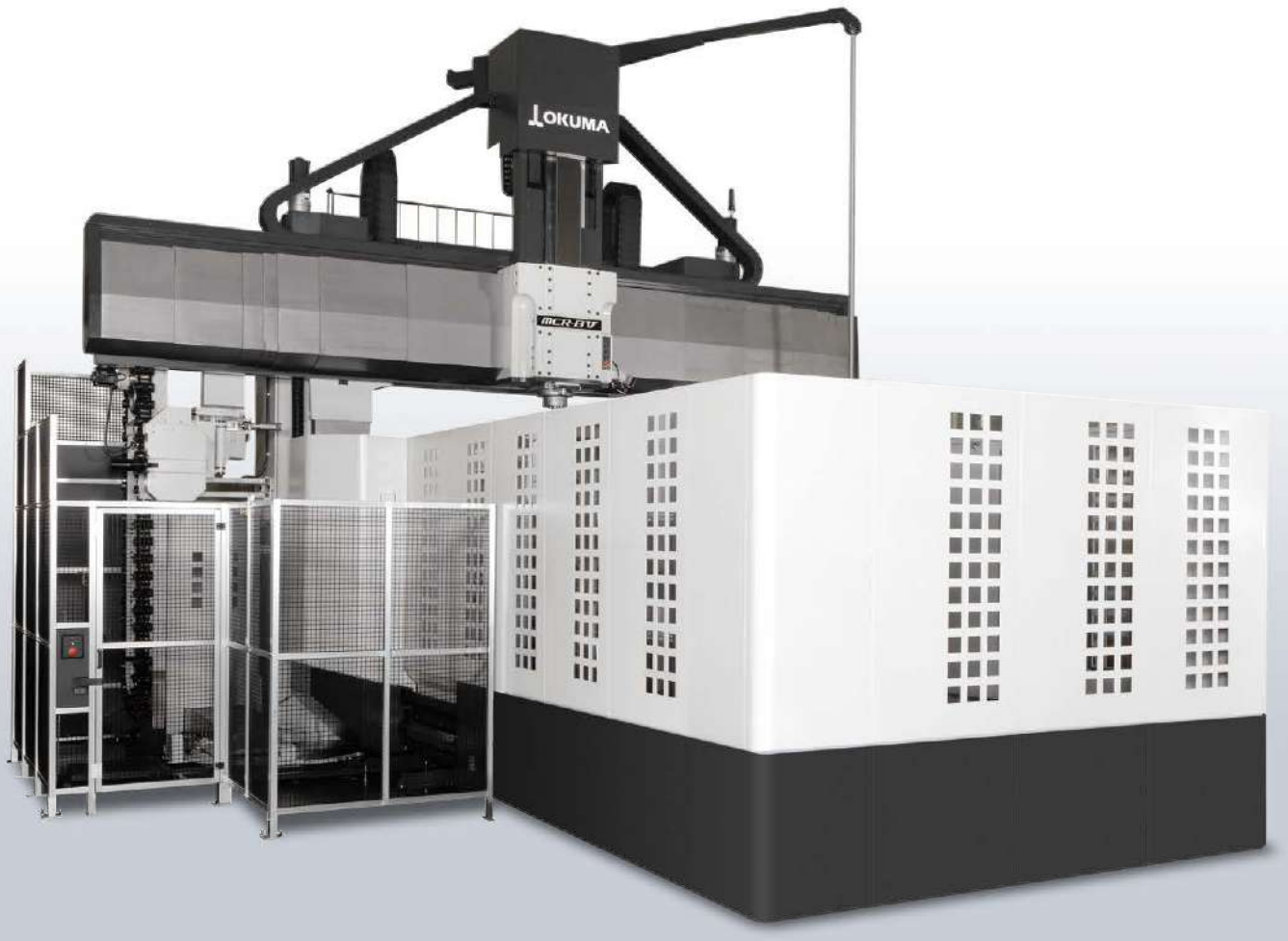
OKUMA

OPEN POSSIBILITIES

MCR-BV

Double-Column Machining Center
[5-Face Machining]



MCR-BV

Double-Column Machining Center
[5-Face Machining]

Intelligent Technology | Thermo-Friendly Concept | Collision Avoidance System | Machining Navi | SERVONAVI

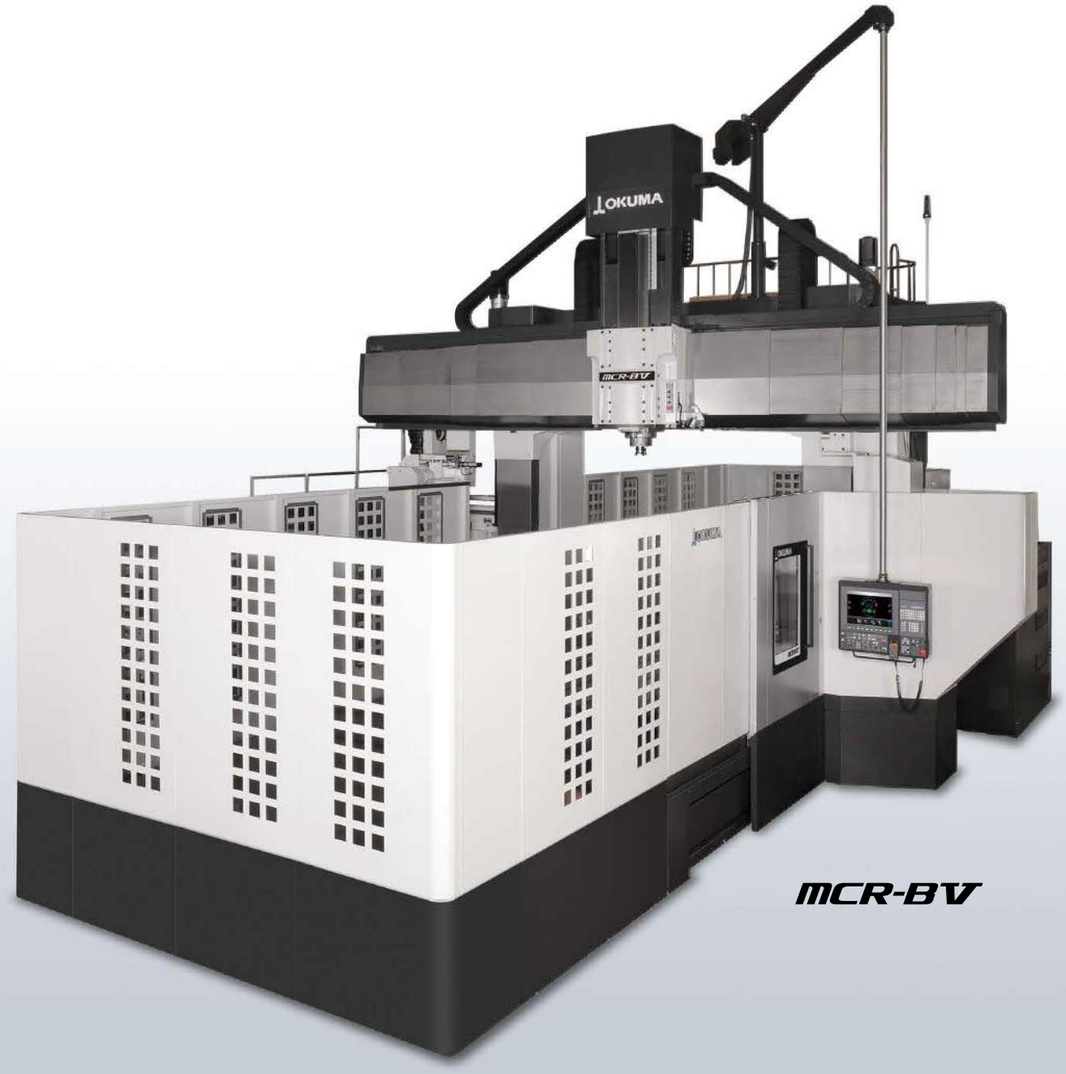
Supporting a wide range of machining from powerful cutting of large parts with complex shapes to high-accuracy finishing

The use of an integral motor/spindle provides high torque and high output that enables a wide range of high-quality machining from heavy-duty cutting of iron and castings to high-efficiency machining of aluminum parts.

Equipped with Thermo-Friendly Premium specifications, AbsoScale detection, and 3D Calibration as standard equipment to achieve stable machining accuracy even during long-term continuous operation.

A selection of attachment heads is available that can process complex-shaped parts at optimal conditions.

The MCR-BV is a highly versatile machine that can be used in a wide range of machining applications.



Photographs used in this brochure may show optional equipment.

Double-column machining center for 5-face applications greatly contributes to productivity improvement with a power-up spindlehead and abundant attachment heads

As a double-column machining center for 5-face applications that meets a wide variety of processing requirements in the machining markets for large parts like the general machinery, vehicles, ships, and aircraft parts industries.

By reducing cycle times, expanding work envelopes, and improving workability, it greatly contributes to the improvement of productivity.

Powerful cutting reduces cycle times

A high torque, high output integral motor/spindle is used as standard equipment for the spindle, and cycle times are shortened by powerful cutting.
Chip volume: 1,170 cm^3/min . . . Spindle motor max output: 43 kW, max torque: 1,406 N-m

Expanding work envelopes and providing speedups

Expanded effective width between columns, extended table travels, expanded work envelopes, and increased rapid traverse rates
Rapid traverse . . . X axis: 30 m/min, Y axis: 32 m/min
(Previous model . . X axis: 15 m/min, Y axis: 20 m/min)

High-accuracy machining specifications as standard

Three specifications are used as standard for high-accuracy machining.

- Thermo-Friendly Premium that suppress thermal deformation
- AbsoScale Detection that makes possible highly accurate positioning
- 3D Calibration for volumetric accuracy comparisons

High efficiency with abundant number of attachment heads, for wide-range multitasking machining at will

The wide variety of previous attachment heads can also be used.

Improved maintainability by improving chip discharge capacity

Double the amount of chips discharged by expanding the conveyor width

X-axis travel (table front /back)	mm	4,200 to 12,200
Y-axis travel (spindlehead L/R)	mm	3,200, 3,700, 4,200
Z-axis travel (ram vertical)	mm	800
W-axis travel (crossrail vertical)	mm	1,000, 1,200
Effective width between columns	mm	2,650, 3,150, 3,650
Speed range	min^{-1}	30 to 6,000
Table size	mm	2,000 × 4,000 to 3,000 × 12,000
Table maximum load	kg	22,000 to 66,000

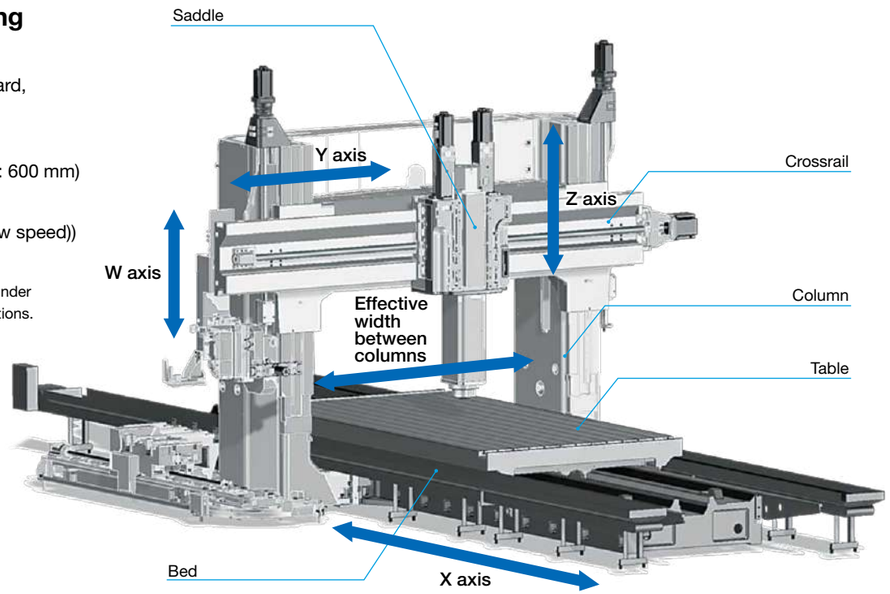
Okuma double-column machining centers– highly rigid and accurate construction

Shortening of cycle times by powerful cutting

By using a high torque, high output integral motor/spindle as standard, it is possible to handle power cutting to high precision finishing.

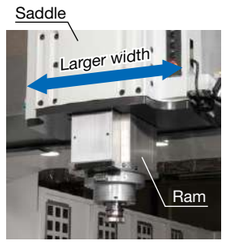
- Machining capacity: **1,170 cm³/min**
  (workpiece material: S45C, Z-axis protrusion: 600 mm)
- Spindle speed: 6,000 min^{-1}
- Maximum output: 43/37/30 kW (10 min/cont (high speed)/cont (low speed))
- Maximum torque: 1,406/981 N-m (10 min/cont)

* Note: The data shown here represent "actual data," which may not be obtained under different environmental, machine specifications, tooling, cutting, and other conditions.



Increased spindlehead rigidity

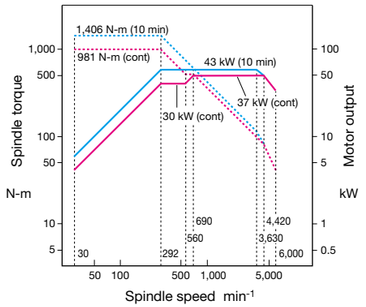
The saddle which encases the ram is 100 mm wider and more rigid than the previous model.

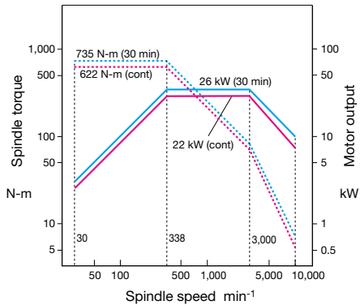


Spindle variations available for wider cutting ranges

■ **Standard spindle**
- Spindle speed: 6,000 min^{-1}
- Max output: 43/37/30 kW (10 min/cont (high speed)/cont (low speed))
- Max torque: 1,406/981 N-m (10 min/cont)

■ **10,000 min^{-1} Spindle** (Optional)
- Spindle speed: 10,000 min^{-1}
- Max output: 26/22 kW (30 min/cont)
- Max torque: 735/622 N-m (30 min/cont)





Increased table rigidity

Equipped with a high-rigidity table that can withstand the weight of large workpieces and high cutting forces.

The table is 30% thicker than the previous model.

Rapid traverse rate improved

- Rapid traverse ... X axis: **30 m/min***
  double the previous model
  Y axis: **32 m/min**
  1.6 times that of the previous machine
  * X-axis travel: 6,700 mm or less

Larger work envelope

The work envelope has been made bigger by extending the X-axis travel distance and widening the effective width between columns.
Ex: 30 × 50 type

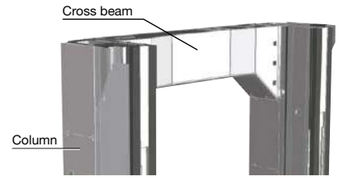
- X-axis travel: **5,200 mm**
  +200 mm compared to the previous model
- Effective width between columns: **3,150 mm**
  +100 mm compared to the previous model

Double-column construction with square columns

The double-column structure with square columns has sufficient rigidity for vertical, horizontal, and twisting loads, withstanding heavy-duty cutting and maintaining high accuracy.

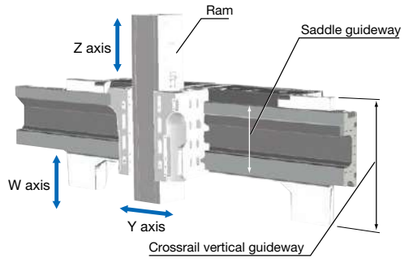
Cross beam optimization

A simple structure is achieved with integration of the top beam and cross beam based on structural analysis for the best design. Stable quality is maintained over long times.



Crossrail vertical guideway
(Crossrail vertical movement: W axis)

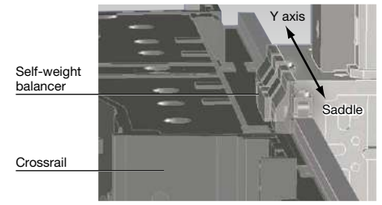
The crossrail elevating guideways are designed with sufficient length for little zig-zag motion and a long high-accuracy service life.



Spindlehead guideways
(Spindlehead left/right travel: Y axis)

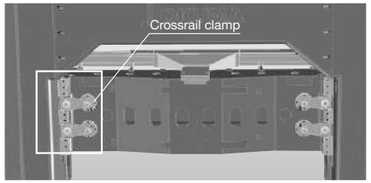
The spindlehead guideway has a highly rigid rectangular cross-sectional geometry. It is also supported by a self-weight balancing device via a roller on the crossrail.

High quality machined surfaces and fast, accurate movements are obtained with these structures.



Crossrail clamp
(Crossrail vertical movement: W axis)

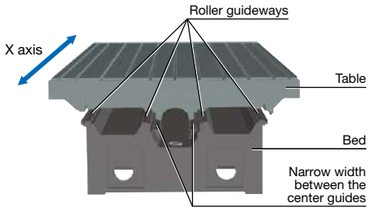
Powerful clamping devices that apply the principle of levers are used on crossrail clamps for powerful machining.



Roller guide system for table guide
(Table front/back movement: X axis)

The table moves with a roller guideway and the heavy weight of the table and workpiece is supported with four roller bearings on hardened and ground guideways. This allows for agile, smooth movements and accurate positioning unaffected by weight changes from heavy workpiece loads.

The layout puts the drive system (ball screw) in the center of the table and narrow, horizontal roller guideways. This can maintain stable, outstanding linear motion straightness over the long term.



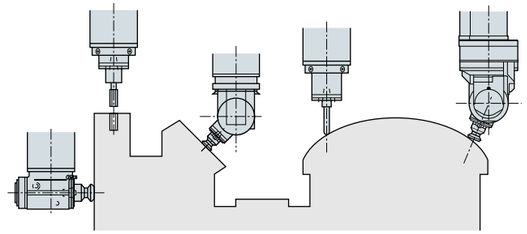
Achieve high efficiency with a full array of attachment heads, ATC/AAC, and a wider range of multitasking applications at will

Abundant range of attachment heads

All kinds of shapes can be machined under the best conditions with the abundant variation of attachments.

Many different processes can be performed continuously in auto operation with the auto tool changer (ATC) and auto attachment changer (AAC), greatly increasing productivity.

For oil hole, air hole, thru-spindle coolant, oil mist, and dual contact specifications for each attachment head (some specifications not available).



■ Attachment head variations

Extension head					
	L150	4,000 min^{-1} (43 kW)	6,000 min^{-1} (30 kW)	High output specifications 6,000 min^{-1} (43 kW)	
	L250	4,000 min^{-1} (37 kW)	6,000 min^{-1} (26 kW)	10,000 min^{-1} (26 kW)	
		High output specifications 4,000 min^{-1} (43 kW), 6,000 min^{-1} (37 kW)			
	Others, L350, L450, L500, L600	20,000 min^{-1} (15 kW)			
90° angular head					
	L150	3,000 min^{-1} (30 kW)	6,000 min^{-1} (22 kW)		
	L250	3,000 min^{-1} (30 kW)	6,000 min^{-1} (22 kW)		
	Others, L355, C-axis: 1 indexing, Thru-spindle specs, High output specifications L270	3,000 min^{-1} (43 kW)			
Special angular head					
	30°	2,000 min^{-1} (22 kW)	6,000 min^{-1} (7.5 kW)	15,000 min^{-1} (11.2 kW)	
	45°	2,000 min^{-1} (22 kW)			
Universal index head (B-/C-axis)					
	B, C axis: 5 indexing	2,000 min^{-1} (15 kW)	6,000 min^{-1} (15 kW)		
	B axis: 1 indexing, C axis: 5 indexing	2,000 min^{-1} (15 kW)	6,000 min^{-1} (15 kW)		
	B, C axis: 1 indexing	2,000 min^{-1} (15 kW)	6,000 min^{-1} (15 kW)	20,000 min^{-1} (15 kW)	
Ver/hor swivel head					
	L280	3,000 min^{-1} (22 kW)			
NC-BC universal head					
	L830	6,000 min^{-1} (26 kW)			
	L890	10,000 min^{-1} (15 kW)			
	L945	20,000 min^{-1} (15 kW)			

*Note: Please consult for applications which may have restrictions.
*Maximum output is shown in parenthesis.
■ Coolant applications for above attachment heads: (1) Coolant/air blow switchable (optional) (2) Oil-mist coolant preparations (optional)
■ Attachment head cooler: Equipped with all above attachment heads (standard)

MCR-BⅡ and -BⅢ attachment heads can also be used

A wide variety of the previous attachment heads can be used.

A built-in B-/C-axis universal index head can also be installed (Optional).

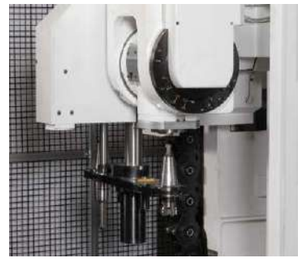
Fast ATC (Automatic Tool Changer)

One ATC arm performs the changes for both the horizontal and vertical spindles. And with the next tool brought to the standby position during a machining operation, the actual tool change can be done in the shortest time possible.

The ATC can be used with a variety of attachment heads: extension, 90° angular, special angular, and B-/C-axis universal index heads.

Extension head

90° angular head



Universal index head

Smaller and faster AAC (Automatic Attachment Changer)

Completely automate machining of multiple sides with a variety of attachment heads that mount automatically and accept ATC.

Auto attachment head change: Attachment station moves near the spindlehead below the crossrail, then attachments are changed.

The attachment head station is set at the rear of the ATC magazine behind the column

Changings heads: extension to 90°angular

Changings heads: extension to B-/C-axis universal index

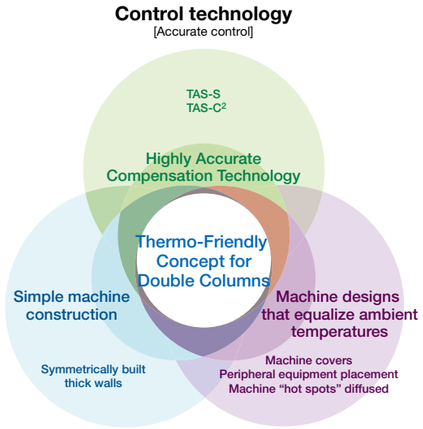
Changings heads: B-/C-axis universal index to 90°angular

High accuracy is enabled in normal factory environments

Thermo-Friendly Concept
Manageble Deformation — Accurately Controlled

Eliminate waste with the Thermo-Friendly Concept

Okuma's Thermo-Friendly Concept achieves high dimensional stability not only when the room temperature changes, but also at machine startups or when machining is resumed. To stabilize thermal deformation, warming-up time is shortened and the burden of dimensional correction during machining restart is reduced.



Control technology
[Accurate control]

Machine design
[Manageable thermal deformation]

Super dimensional stability minimizes machining dimensional changes over time

Machine startup
Machining restart
Room temp change

High dimensional stability

1	2	3
Minimal temperature deviation	Manageable thermal deformation	Accurate compensation

[Manageable Deformation] [Accurately Controlled]

Integrated machine design and control technology

The Thermo-Friendly Concept plays a principal role in our machine design. With simple machine designs and construction that equalize ambient temperatures, deformation is predictable, and complex torsion or tilting is controlled.

Highly accurate compensation technology with the OSP controller developed by Okuma accurately controls thermal deformation from room temperature changes, spindle thermal deformation from frequently changing spindle speeds, and inconsistent thermal deformation from coolant temperature.

With the Thermo-Friendly Concept (Manageable Deformation—Accurately Controlled), Okuma products provide unrivaled dimensional stability.

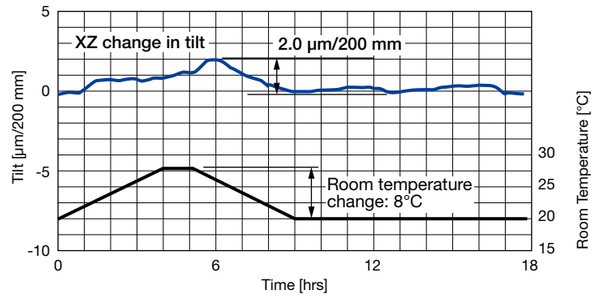
Thermal deformation of 20 µm or less during a room temperature change of 8°C

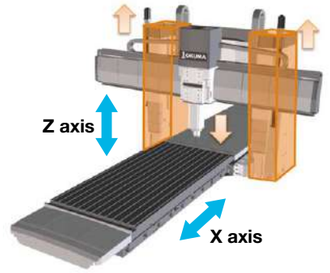
The Z-axis tilt due to changes in room temperature has been suppressed more than before by mechanical designing that further adjusts the heat balance of the column without actually cooling the column.

Z-axis tilt due to ambient temperature change

2.0 µm/200 mm (actual data)*1

Ambient temperature change: 8°C in the X-axis direction

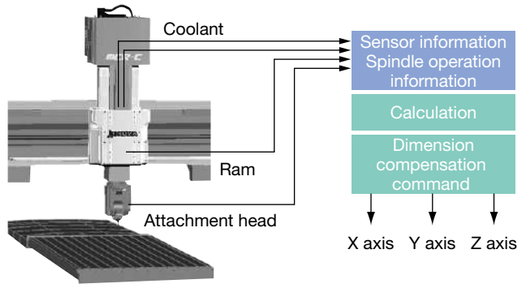




*1. Calculated from measurement displacement at the height of 500 mm

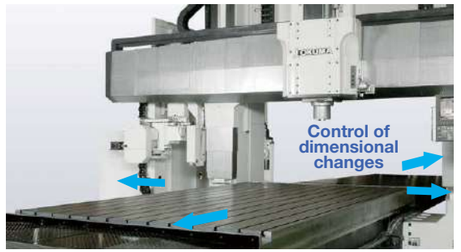
Thermo Active Stabilizer—Spindle (TAS-S)

Thermal deformation of the spindle from high spindle speeds is accurately controlled (X, Y, Z axes). Accurate control is also performed in cases of frequent spindle speed changes, and thermal deformation of attachment heads are also controlled.



Thermo Active Stabilizer—Construction for large machines: TAS-C²

The machine (construction) is optimally controlled to maintain the required machining accuracies even when ambient temperatures change. In addition, it is possible to control dimensional changes due to thermal expansion of the table and obtain stable dimensional accuracy even for large workpieces.



ECO suite
Next-Generation Energy-Saving System

A suite of energy saving applications for machine tools.

ECO Idling Stop
Auto cooler turnoff, with accuracy assured

Intelligent energy-saving function with the Thermo-Friendly Concept. The machine itself determines whether or not cooling is needed and cooler idling is stopped with no loss to accuracy.

Electricity consumption during non-machining time greatly reduced with "ECO Idling Stop", which shuts down each piece of auxiliary equipment not in use.

ECO Power Monitor
On-the-spot check of energy savings

Power is shown individually for spindle, feed axes, and auxiliaries on the OSP operation screen. The energy-saving benefits from auxiliary equipment stopped with ECO Idling Stop can be confirmed on the spot.

ECO Operation (Optional)
Intermittent/linked operation of chip conveyor, or mist collector during machining

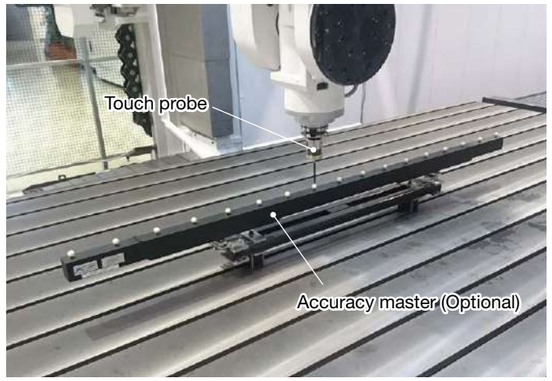
Maintaining high machine accuracy

3D Calibration
Calibrating the volumetric accuracy of the machine

■ Any operator can easily calibrate machine accuracy
Factory floor surface deformation over the long term, affects machine accuracy.

With 3D Calibration, the accuracy master, which is the absolute accuracy standard, is installed on the table, and the automatic measurement of the touch probe is performed with a simple operation to check and calibrate the machine accuracy. By calibrating regularly, high accuracy can be maintained over the long term.

Note: The comparison of machine accuracy measurement values that can be calibrated differs depending on the machine specifications and type of accuracy master (Optional) used.



Accuracy Stability Diagnosis Function
Self-diagnosis of changes in machine accuracy

■ To diagnose mechanical thermal deformation due to non-uniform factory temperatures
On production floors where the machine is exposed to wind or sunlight, the temperature around the machine becomes uneven, creating an environment in which the thermal deformation of the machine tends to increase.

The Accuracy Stability Diagnosis Function estimates the change in machine accuracy due to non-uniform factory temperatures, quantifies it as "accuracy stability" and displays that information on the screen.

If the accuracy is unstable, the operator will be notified by a message or alarm. More stable machining accuracy can be achieved by performing accuracy checks and adjustments when notified.

■ Diagnosing changes in machine accuracy from factory floor thermal deformation
The change in machine accuracy due to thermal deformation of the production floor is also estimated and quantified as a factor of "accuracy stability". Notifications of the best timing for machine accuracy adjustments with 3D Calibration etc, will be provided.

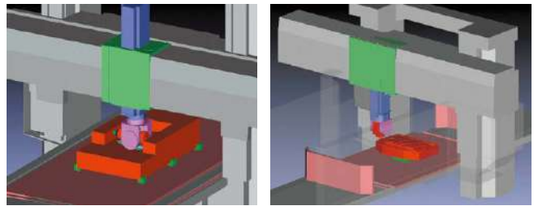
Okuma Intelligent Technology exhibits powerful effect on machine shop floors

Collision Avoidance System (Optional)
Collision prevention

Significantly reducing setup and trial times

■ "Concentrate on machining" without collision worries
NC controller (OSP) with 3D model data of machine components—workpiece, tool, fixture, spindle, attachment head— performs real time simulation just ahead of actual machine movements. In both automatic operation and manual movements, advance checks are made for interference or collisions and the machine movement is stopped.

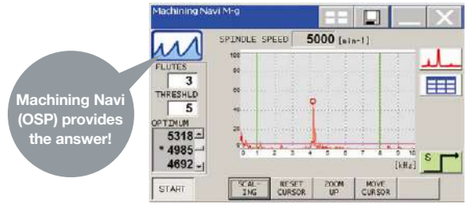
Machinists (novice or pro) will benefit from reduced setup and trial cycle times, and the confidence to focus on making parts.



Machining Navi M-$g\mathrm{II}$ (Optional)
Cutting condition search for milling/machining

Longer tool life and shorter machining times by optimizing cutting conditions

■ Maximizing machine tool performance
Navigates effective measures by detecting and analyzing machining chatter with a microphone attached to the machine. Effects are seen mainly on high rotation chatter with M-$g\mathrm{II}$.



SERVONAVI
Optimized Servo Control

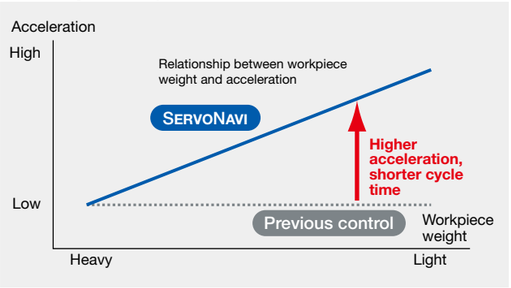
Achieves long term accuracy and surface quality

■ SERVONAVI AI (Automatic Identification)

● Work Weight Auto Setting
Cycle time shortened with faster acceleration

On table travel type machining centers, the table feed acceleration with the previous system was the same regardless of weight, such as workpieces and fixtures loaded on the table.

Work Weight Auto Setting estimates the weight of the workpiece and fixture on the table and automatically sets the linear axis servo parameters, including acceleration, to the optimum values. Cycle times are shortened with no changes to machining accuracy.



■ SERVONAVI SF (Surface Fine-tuning)

● Reversal Spike Auto Adjustment
Maintains machining accuracy and surface quality

Slide resistance changes with length of time machine tools are utilized, and discrepancies occur with the servo parameters that were the best when the machine was first installed. This may produce crease marks at motion reversals and affect machining accuracy (part surface quality).

Reversal Spike Auto Adjustment maintains machining accuracy by switching servo parameters to the optimum values matched to changes in slide resistance.

● Vibration Auto Adjustment
Contributes to longer machine life

When aging changes machine performance, noise, vibration, crease marks, or fish scales may appear.

Vibration Auto Adjustment can quickly eliminate noise and vibration even from machines with years of operation.

● Deflection Auto Adjustment
Maintaining high quality machined surfaces on dies/molds

With fast accleration/deceleration in the machining of dies and molds, etc, positioning error due to bending (ball screw expansion/contraction) can affect the machined surface quality.

Deflection Auto Adjustment maintains the surface quality of die/mold machined surfaces by automatically adjusting the servo parameters to match the amount of bending, even when the amount of bending of the ball screw has changed and positioning error has occurred as a result of changes over time.

Technology for high-speed, high-accuracy machining

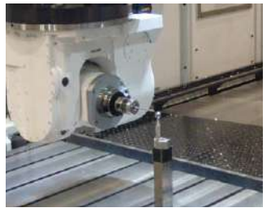
Rotation compensation that used to take half day to a full day now done automatically in twenty minutes*

Auto Attachment Head Compensation (Optional)

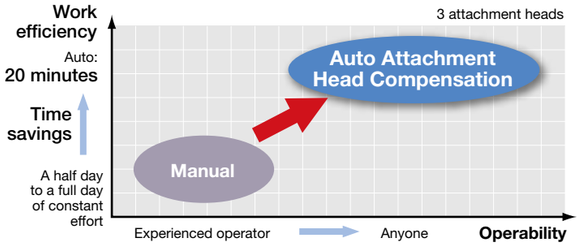
Auto Attachment Head Compensation is a function that is automatically sets attachment head rotation compensation values. It is quick, easy and can be used by anyone. By setting the compensation values, the program commands can be made for tool tip position even with different attachment head type and rotation tilt. Creation of NC programs and machine operation becomes much easier.

Auto Attachment Head Compensation performs this rotation compensation work automatically, enabling automatic setting in 20 minutes* for a task that used to take an experienced operator a half to full day with three attachment heads. High machining accuracy can also be maintained with regular measurements.

Note: The time needed for automatic settings differs with the attachment head.



The datum sphere is fixed to the table and measurement preparations are completed by simply positioning the attachment head with attached touch probe near the top of the datum sphere.



With auto machining data compensation

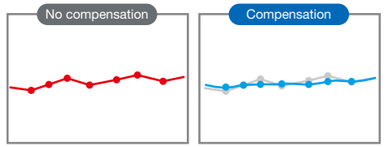
Hyper-Surface*1 (Optional)

This feature automatically compensates for part program irregularities related to machining surface defects on curved surfaces and suppresses streaks to achieve high surface quality cutting.

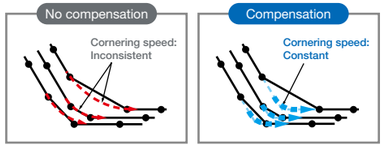
- **Improve machined surface quality by suppressing variations in command position and feed rates**

Automatically compensates for small variations in machining data command positions of output from a CAM processor. And passing speeds for each cutter path at corners are made consistent. That stabilizes feed rates and improves surface quality.

Smooths minor fluctuations and variations In command points



Consistent passing speeds to align corner paths



Comparison of machined surface quality

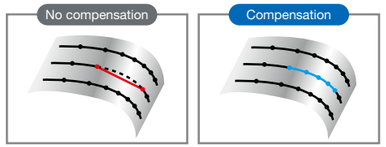
Hyper-Surface No compensation

Hyper-Surface Compensation

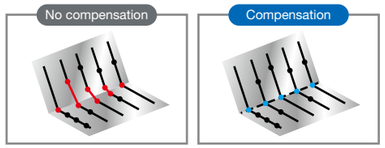
- **Aligning adjacent cutter paths, reducing ridges**

Correcting uneven spaces between adjacent cutter paths, and reducing inconsistent valley depths and edge widths.

Adjust steps errors between adjacent cutter paths



Reproducing edge lines between sides



*1. Please contact your Okuma representative for 5-axis applications.
There are no limitations for simultaneous operations with the Collision Avoidance System.

Smooth discharge of large amounts of chips

Recommended specifications for chip discharge

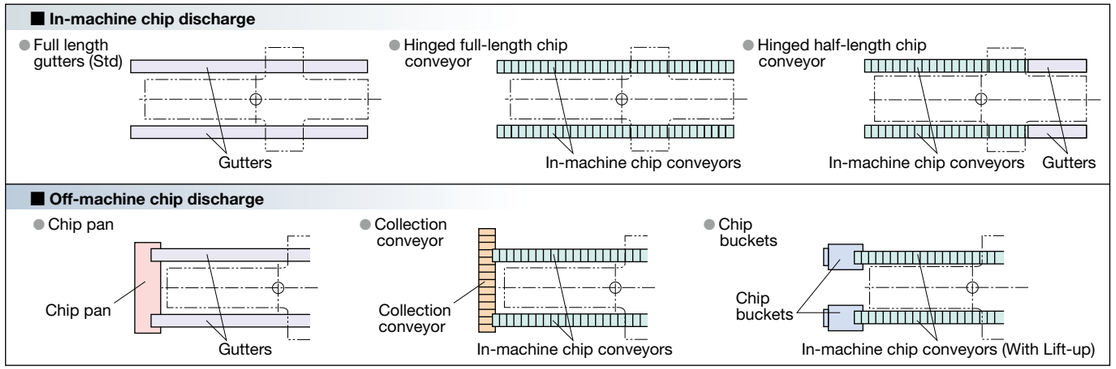
○: Recommended △: Conditionally recommended

Material		Steel, stainless steel	Cast iron	Aluminum, titanium, non-ferrous metal	Mixed (general)*4	Special blank materials
Chip shape						Ceramic, carbon, glass, etc.
In-machine	Full length gutters (Std)	○	○	○ (*3 Chip flusher)	○	○
	Hinge type	○	○	○	○	—
Off-machine (Collection conveyor)	Hinge type	○	○ (Dry)	—	△ (*2)	—
	Scraper type	—	○ (Dry)	—	—	—
	Magnet scraper type	—	○ (Wet)	—	—	—
	2-step (*1) (with drum filter)	△ (*2)	△ (*2)	○	△ (*2)	—

*1. Hinged + scraper type *2. When there are many fine chips
*3. Chip flusher is an optional specification
*4. General-purpose applications: steel, stainless steel, cast iron

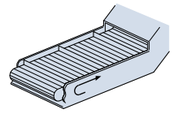
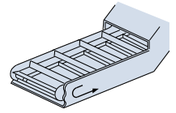
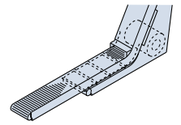
Note: Do not use oil-based coolant which is a fire hazard.

Example of chip conveyor placement



Note: Conveyor chip discharge direction (rear), off-machine chip conveyor discharge direction (operation side, magazine side), chip coolant tank position, etc. can be combined to match space. Please consult with your Okuma sales representative to confirm final arrangements.

Collection conveyor chip discharge (lift-up conveyors)

Type	Hinge	Scraper	Hinge + scraper (with drum filter)
Shape			

Standard Specifications

Main motor and standard electricals		Z-axis double ball screw	
Spindle cooler	Oil controller	Full length gutter	Both machine sides
AbsoScale detection (X, Y, Z axes)*1		ATC air blower (blast)	
Thermo-Friendly Premium	TAS-S and TAS-C^2 included	Spindle air curtain	
3D Calibration	Includes linear axis error measurement, volumetric error compensation, and geometric error compensation	Magazine tool loader	
		ATC magazine safety fence	
		Column slideway covers	
Accuracy Stability Diagnosis Function		Crossrail clamp system	
		Seesaw pendant operation panel	Elevation: 600 mm
Auto gauging & auto zero offset	Touch probe	Work lamp	LED
0.1 µm control*2	Controlled by 0.1 µm increment program commands	Status indicator	3-color LED
		Door interlock	
Synchronized NC W-axis	Included in AbsoScale detection (W axis)	Tool kit	
Hydraulic unit		Tapered bore cleaning bar	
Automatic Tool Changer	No. of tools: 50	Tool box	

Note: Use of oil-based cutting fluid may cause a fire, so fire prevention measures are required. Unattended operation should not be performed.
*1. The X-axis uses is a linear scale for n × 65 or larger machines (6,700 mm or more X-axis travel).
*2. For n × 100 or larger machines (10,200 mm or more X-axis travel), 1 µm control will be used.

Kit Specifications

Machine kit specs	S/DM-S	A/DM-A	P/DM-P	AP/DM-AP
Attachment head ATC	●	●	●	●
Attachment head auto attaching/indexing unit (AAC)		●		●
Attachment head manual tool changing	●	●	●	●
Attachment head coolant lines	●	●	●	●
Auto pallet changer (APC) preparations			●	●
X-axis 2.0 m travel extension (side shuttle APC)			●	●

DM: die/mold

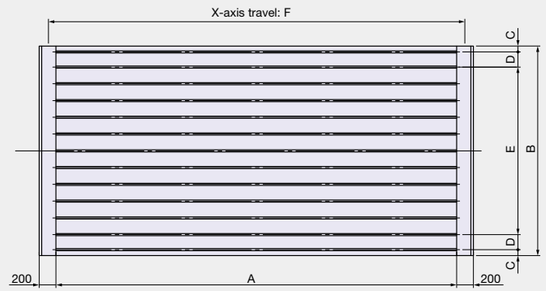
Optional Specifications

Automatic pallet changer	2-pallet side shuttle (2.0 m extension in X-axis travel)	Ram oil pan slush collector	
		Speed-increasing attachment head preps	
Optional Z-axis travel	1,000 mm	Angle head preps	
Coolant system		Auto attachment changer (AAC)	2 stations to 7 stations
Coolant tank	500 L, 1000 L	Attachment head	Please consult
Coolant heater/cooler		Dust-proofing	
Oil skimmer		NC rotary tables	NC rotary table, inclined rotary table
Filtration system		Mist collector	
Semi-dry machining		Dust collector	
Thru-spindle coolant *1	High/low pressure switch (2 MPa, 7 MPa)	Full-enclosure shielding	w/o ceiling, with ceiling
Centralized coolant application		Auto tool length compensation & breakage detection	Touch sensor system, Laser sensor system
Coolant pump	0.75 kW, 1.1 kW		
Oil mist coolant	Universal nozzle type	In-machine conveyors	Full length, lift-up type
Oil-hole coolant system	High/low pressure switch (2 MPa)		Half length, lift-up type
Chip air blower (blast)			Full length gutter + gutter chip flusher
ATC tool magazine capacity	80, 100, 120, 180 tools	Chip flushers	Crossrail shower (L/R column front), front/back gutters with telescopic covers, work wash gun
ATC tools	Tool weigth (35 kg × 100 mm)		
Tool shank profile	CAT 50, DIN 50		
Pull-stud shape	MAS 1, special CAT	Collection conveyors	Hinged, hinge + scraper (w/ drum filter)
Table T-slot width	20H7, 22H7, 28H7		Hinged + magnetic separator
Table cross-groove width	Please consult for width depth, pitch	Chip buckets	L type, H type
Optional table width	+300 mm	Pendant arms	Parallel linked, manual, electric, floor mounted, front/back travel types
High column specs	200 mm, 400 mm (Please inquire for other specs.)	Foundation methods	Chemical anchors, no foundation bolts (foundation pad only)
Optional W-axis travel	Standard travel can accommodate up to +200 mm, +400 mm	Machine foundation pit work	50 to 1,400 mm (50 mm units)
Fire regulations compliance		Optional control cabinet positions	
Automatic extinguisher			

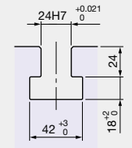
*1. Okuma pull studs required for thru-spindle coolant.

Table Dimensions

Unit: mm



T-slot details



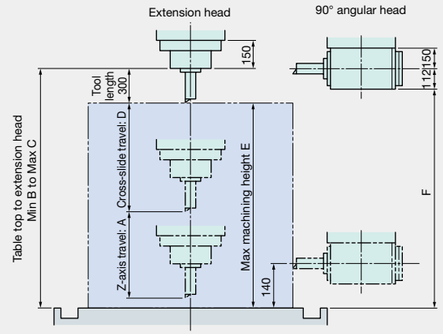
Unit: mm

	Size	A	B	C	D	E	F
25	25 × 40	4,000	2,000	70	130	8 × 200 =1,600	4,200
	25 × 50	5,000					5,200
	25 × 65	6,500					6,700
30	30 × 50	5,000	2,500		180	10 × 200 =2,000	5,200
	30 × 65	6,500					6,700
	30 × 80	8,000					8,200
	30 × 100	10,000					10,200
35	35 × 50	5,000	3,000	100	200	12 × 200 =2,400	5,200
	35 × 65	6,500					6,700
	35 × 80	8,000					8,200
	35 × 100	10,000					10,200
	35 × 120	12,000					12,200

Working Range Drawings

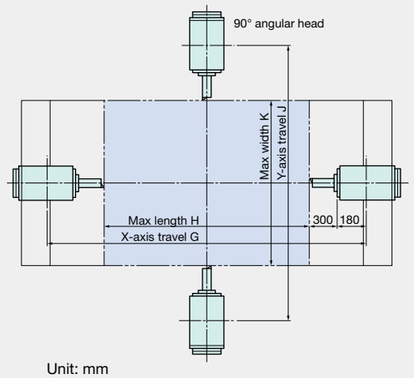
● **Extension head, 90° angular head**

Max height (300 mm tool length)



● **90° angular head**

Max width × length (300 mm tool length)



Unit: mm

Size		EW BC	A	B	C L150 Spec	C L250 Spec	D	E L150 Spec	E L250 Spec	F	G	H	J	K
25	25 × 40	2,650	800	0	1,650	1,550	1,000	1,350	1,250	1,538	4,200	3,240	3,200	2,240
	25 × 50										5,200	4,240		
	25 × 65										6,700	5,740		
30	30 × 50	3,150			1,850	1,750	1,200	1,550	1,450	1,738	5,200	4,240	3,700	2,740
	30 × 65										6,700	5,740		
	30 × 80										8,200	7,240		
	30 × 100										10,200	9,240		
35	35 × 50	3,650			1,800	1,700		1,500	1,400	1,688	5,200	4,240	4,200	3,240
	35 × 65										6,700	5,740		
	35 × 80										8,200	7,240		
	35 × 100										10,200	9,240		
	35 × 120										12,200	11,240		

Remarks:
- The upper drawings and tables show the working range when a 300 mm long tool is attached to the extension or, 90° angular heads.
- Dimensions may change depending on specifications, so please refer to actual delivered machine specifications.

OSP suite OSP-P300MA

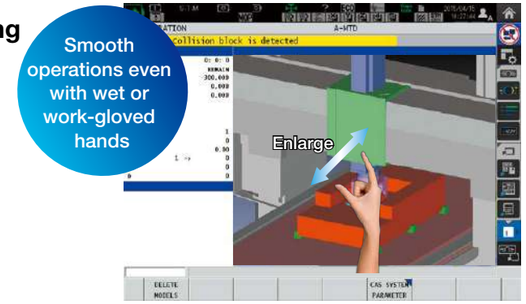
The Next-Generation Intelligent CNC

With revamped operation and responsiveness— ease of use for machine shops first!

Smart factories are using advanced digitization and networking (IIoT) in manufacturing to achieve enhanced productivity and added value. The OSP has evolved tremendously as a CNC suited to advanced intelligent technology. Okuma's new control uses the latest CPUs for a tremendous boost in operability, rendering performance, and processing speed. The OSP suite also features a full range of useful apps that could only come from a machine tool manufacturer, making smart manufacturing a reality.

Smooth, comfortable operation with the feeling of using a smart phone

Improved rendering performance and use of a multi-touch panel achieve intuitive graphical operation. Moving, enlarging, reducing, and rotating 3D models, as well as list views of tool data, programs, and other information can be accomplished through smooth, speedy operations with the same feel as using a smart phone. The screen display layout on the operation screen can also be changed to suit operator preferences and customized for the novice and/or veteran machinists.



Note: Collision Avoidance System (Optional) shown above.

"Just what we wanted."— Refreshed OSP suite apps

This became possible through the addition of Okuma's machining expertise based on requests we heard from real, machine-shop customers. The brain power packed into the CNC, built by a machine tool manufacturer, will "empower shop floor" management.

Maintenance Monitor
Routine inspection support

The Maintenance Monitor displays items for inspections before starting daily operation and regular inspections and the rough estimate of inspection timing. Touching the [INFO] button displays the PDF instruction manual file of relevant maintenance items.

[INFO] button

Spindle Output Monitor
Increased productivity through visualization of motor power reserve

E-mail Notification
Monitoring operating status even when away from the machine

Common Variable Monitor
Comment display for greater ease of use and faster work

Screen Capture
Automatic saving of recorded alarms

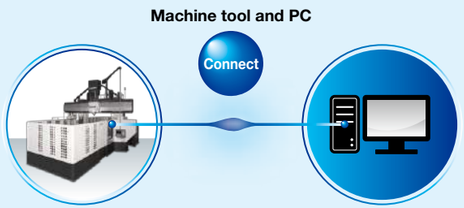
Scheduled Program Editor
Easy programming without keying in code

Connect Plan

Get Connected, Get Started, and Get Innovative with Okuma "*Monozukuri*"

Connect, Visualize, Improve

Okuma's Connect Plan is a system that provides analytics for improved utilization by connecting machine tools and visual control of factory operation results and machining records. Simply connect the OSP and a PC and install Connect Plan on the PC to see the machine operation status from the shop floor, from an office, from anywhere. The Connect Plan is an ideal solution for customers trying to raise their machine utilization.



Standard Specifications

Basic Specs	Control	X, Y, Z, W simultaneous 4-axis, spindle control (1 axis)
	Position feedback	OSP full range absolute position feedback (zero point return not required)
	Coordinate functions	Machine coordinate system (1 set), work coordinate system (20 sets)
	Min / Max command	±9999.9999 mm, ±9999.9999°, 8-digit decimal, command unit: 0.0001 mm, 0.001 mm, 0.01 mm, 1mm, 0.0001°, 0.001°, 1°
	Feed	Override: 0 to 200%, rapid traverse override: 0% to 100%
	Spindle control	Direct spindle speed commands, override 30 to 300%, multi-point indexing
	Tool compensation	No. of registered tools: Max 999 sets, tool length/radius compensation: 3 sets per tool
	Display	15-inch color LCD + multi-touch panel operations
	Self-diagnostics	Automatic diagnostics and display of program, operation, machine, and NC system problems
Programming	Program capacity	Program storage: 4 GB, operation buffer: 2 MB
	Program operations	Program management, editing, scheduled program, fixed cycle, G-/M-code macros, arithmetic, logic statements, math functions, variables, branch commands, coordinate calculate, area machining, coordinate convert, programming help
Operations	"suite apps"	Applications to visualize and digitize information needed on the shop floor
	"suite operation"	Highly reliable touch panel suited to shop floors. One-touch access to suite apps.
	Easy Operation	"Single-mode operation" to complete a series of operations Advanced operation panel/graphics facilitate smooth machine control
	Machine operations	MDI, manual (rapid traverse, manual cutting feed, pulse handle), load meter, operation help, alarm help, sequence return, manual interrupt/auto return, pulse handle overlap, parameter I/O, PLC monitor, Easy setting of cycle time reduction
	MacMan	Machining management: machining results, machine utilization, fault data compile & report, external output
Communications / Networking		USB (2 ports), Ethernet, DNC-T1
High speed/accuracy specs		Thermo-Friendly Premium (TAS-S: Thermo Active Stabilizer—Spindle, TAS-C²: Thermo Active Stabilizer—Construction for large machines), AbsoScale detection (X, Y, Z, W axes), 3D Calibration, Accuracy Stability Diagnosis Function, 0.1 µm control*1, Hi-Cut Pro, pitch error compensation, Hi-G control, SERVONAVI
Measuring functions		Auto gauging & auto zero offset
Energy-saving function	ECO suite	ECO Idling Stop, ECO Power Monitor *2

*1. For n × 100 or larger machines (10,200 mm or more X-axis travel), 1 µm control will be used.
*2. The power display shows estimated values. When precise power values are needed, select the on-machine wattmeter option.

Optional Specifications

Item	Kit specifications	NML E	NML D	3D E	3D D	One-Touch E	One-Touch D
Interactive functions							
Advanced One-Touch IGF-M						●	●
I-MAP				●	●		
Programming							
Auto scheduled program update		●	●	●	●	●	●
G-/M-code macros							
Common variables (Std: 200)	1,000 pcs						
	2,000 pcs						
Program branch 2 sets							
Program notes (MSG)			●		●		●
Coordinate system selection (Std: 20)	100 sets	●		●		●	
	200 sets		●		●		●
	400 sets						
Helical cutting (within 360 degrees)		●	●	●	●	●	●
3D circular interpolation							
Synchronized Tapping II							
Arbitrary angle chamfering		●	●	●	●	●	●
Cylindrical side facing							
Slope machining							
Permissible spindle speed setting							
F1-digit feed	4 sets, 8 sets, parameter						
Programmable travel limits (G22, G23)		●	●	●	●	●	●
Skip (G31)							
Axis naming (G14)							
3-D tool compensation							
Tool wear compensation			●		●		●
Drawing conversion	Programmable mirror image (G62)		●		●		●
	Enlarge/reduce (G50, G51)		●		●		●
User task 2	I/O variables, 16 each						
Tape conversion ★							
Leading edge offset ★							
Inverse time feed							
Alignment compensation							
Monitoring							
Real 3D Simulation				●	●	●	●
Simple load monitor	Spindle overload monitor	●	●	●	●	●	●
NC operation monitor	Hour count-up, work counter	●	●	●	●	●	●
Hour meters	Power ON, spindle run-time NC ON time, machining						
Operation end buzzer	With M02, M30, and END commands						
Work counter	M02, M30 counts						
MOP-TOOL	Adaptive control, overload monitor						
Machine Status Logger							
Cutting Status Monitor							
AI Machine Diagnosis Function	Feed axes						
Tool life management	Cutting time and number of tools	●	●	●	●	●	●
ECO suite Energy-saving function							
ECO Operation							
ECO Power Monitor	On-machine wattmeter						
Energy-saving hydraulic unit	Inverter system						
	ECO Hydraulic						

Item	Kit specifications	NML E	NML D	3D E	3D D	One-Touch E	One-Touch D
Gauging							
Tool breakage detection	Touch sensor (G31) Includes tool offset	Included in machine specs					
Gauging data printout	File output						
Manual gauging (w/o sensor)		●	●	●	●	●	●
Interactive gauging (Touch sensor, touch-probe required)							
External I/O, Communications							
RS-232C connector							
DNC-T3							
DNC-B (RS-232C-Ethernet transducer used on OSP side)							
DNC-DT							
DNC-C/Ethernet							
Additional USB (2 ports are standard)							
Automated/untended operation							
Auto power shut-off	With M02 and END alarms Workpiece preps done → off	●	●	●	●	●	●
Warm-up (by calendar timer)							
External program selection	Button type, rotary switch BCD (2-digit, 4-digit)						
Cycle time reduction (Reduced cycle time)							
High-speed, high-precision							
Auto Attachment Head Compensation							
Hyper-Surface *1	3-axis Type A, Type B						
Super-NURBS *2	5-axis Type A, Type B						
Simultaneous 5-axis kit							
Operations							
Control cabinet lamp							
Circuit breaker							
Sequence operation	Sequence stop	●	●	●	●	●	●
Upgraded sequence restart	Mid-block return		●		●		●
Pulse handles	2, 3 (1 standard)						
LCD pulse handle							
External M code	4, 8						
Collision Avoidance System *1 *2							
Machining Navi M-gII (cutting condition search function)							
One-Touch Spreadsheet							
Block skip	3 sets						
Feed axis retract							
OSP-VPS (Virus Protection System)							
19-inch operation panel							

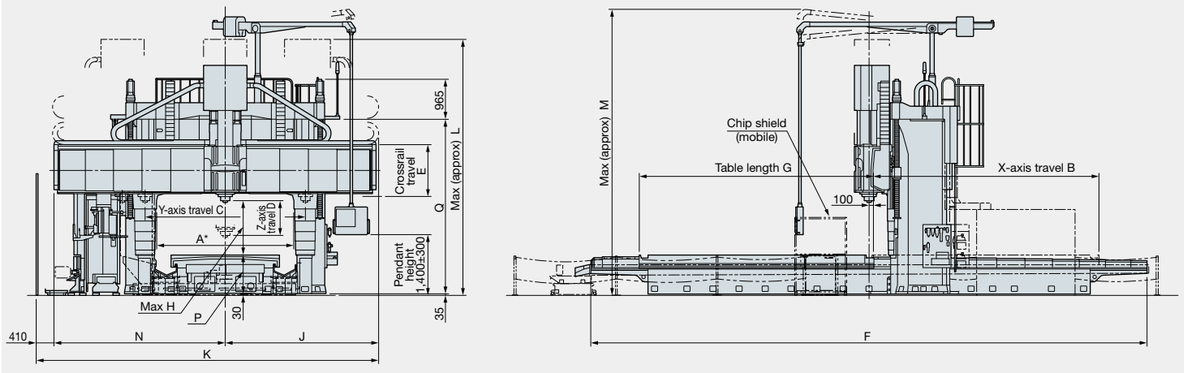
Note 1. NML: Normal, 3D: 3D Simulation, E: Economy, D: Deluxe
Note 2. ★Technical consultation needed for specifications
*1. There are limitations when Hyper-Surface and Collision Avoidance System are used simultaneously.
*2. There are limitations when Super-NURBS and Collision Avoidance System are used simultaneously.

Machine Specifications

Item	Unit	MCR-BV 25			MCR-BV 30				MCR-BV 35				
		25 × 40	25 × 50	25 × 65	30 × 50	30 × 65	30 × 80	30 × 100	35 × 50	35 × 65	35 × 80	35 × 100	35 × 120
● Travel													
X-axis (table front/back)	mm (in)	4,200 (165.35)	5,200 (204.72)	6,700 (263.78)	5,200 (204.72)	6,700 (263.78)	8,200 (322.83)	10,200 (401.57)	5,200 (204.72)	6,700 (263.78)	8,200 (322.83)	10,200 (401.57)	12,200 (480.31)
Y-axis (spindlehead left/right)	mm (in)	3,200 (125.98)			3,700 (145.67)				4,200 (165.35)				
Z-axis (ram up/down)	mm (in)	800 (31.50) [1,000 (39.37)]											
W-axis (crossrail up/down)	mm (in)	1,000 (39.37)			1,200 (47.24)								
Effective width between columns	mm (in)	2,650 (104.33)			3,150 (124.02)				3,650 (143.70)				
Table to spindle nose *1	mm (in)	0 to 1,650 [0 to 1,550]*1 (0 to 64.96 [0 to 61.02]*1)			0 to 1,850 [0 to 1,750]*1 (0 to 72.83 [0 to 68.90]*1)				0 to 1,800 [0 to 1,700]*1 (0 to 70.87 [0 to 66.93]*1)				
● Table													
Working surface	mm (in)	2,000 × 4,000 (78.74 × 157.48)	2,000 × 5,000 (78.74 × 196.85)	2,000 × 6,500 (78.74 × 255.91)	2,500 × 5,000 (98.43 × 196.85)	2,500 × 6,500 (98.43 × 255.91)	2,500 × 8,000 (98.43 × 314.96)	2,500 × 10,000 (98.43 × 393.70)	3,000 × 5,000 (118.11 × 196.85)	3,000 × 6,500 (118.11 × 255.91)	3,000 × 8,000 (118.11 × 314.96)	3,000 × 10,000 (118.11 × 393.70)	3,000 × 12,000 (118.11 × 472.44)
Maximum load	kg (lb)	22,000 (48,400)	27,000 (59,400)	34,000 (74,800)	33,000 (72,600)	43,000 (94,600)	52,000 (114,400)	66,000 (145,200)	29,500 (64,900)	37,000 (81,400)	47,000 (103,400)	61,000 (134,200)	65,000 (143,000)
T-slots Width × No. <center pitch>	mm	24H7 × 11 (center 200, both ends 130)			24H7 × 13 (center 200, both ends 180)				24H7 × 15 (center 200)				
Height from machine bottom	mm (in)	850 (33.46)			900 (35.43)				950 (37.40)				
● Spindle													
Speed range	min^{-1}	30 to 6,000 [30 to 10,000]											
Taper bore		7/24 taper No. 50											
Bearing diameter	mm (in)	ø85 (3.35) [ø100 (3.94)]											
● Feedrates													
Rapid traverse *2	m/min (fpm)	X: 30, Y: 32*3, Z: 15 (X: 98.43, Y: 104.99, Z: 49.22)			X: 30, Y: 32*3, Z: 15 (X: 98.43, Y: 104.99, Z: 49.22)		X: 20, Y: 32*3, Z: 15 (X: 65.62, Y: 104.99, Z: 49.22)		X: 30, Y: 32*3, Z: 15 (X: 98.43, Y: 104.99, Z: 49.22)		X: 20, Y: 32*3, Z: 15 (X: 65.62, Y: 104.99, Z: 49.22)		
Cutting feedrate	mm/min (ipm)	1 to 10,000 (0.04 to 393.70)											
W-axis travel rate	m/min (fpm)	3 (9.84)											
● Automatic Tool Changer													
Tool shank		MAS BT50											
Pull stud		MAS 2											
Tool magazine capacity	tools	50 [80, 100, 120, 180]											
Max tool diameter	mm (in)	w/ adjacent tools: ø135 (5.31); w/o adjacent tools: ø230 (9.06)											
Max tool length	mm (in)	400 (15.75) [600 (23.62)]											
Max tool mass	kg (lb)	25 (55)											
Tool selection		Fixed adress											
● Motors													
Spindle drive	kW (hp)	43/37/30 (57/50/40) (10 min/cont (high speed)/cont (low speed)) [26/22 (35/30) (30 min/cont)]											
Axis feed drives	kW (hp)	X: 9.4, Y: 6.4, Z: 5.2 × 2 (X: 12.5, Y: 8.5, Z: 6.9 × 2)	X: 14.0, Y: 6.4, Z: 5.2 × 2 (X: 18.7, Y: 8.5, Z: 6.9 × 2)		X: 14.0, Y: 6.4, Z: 5.2 × 2 (X: 18.7, Y: 8.5, Z: 6.9 × 2)								
Crossrail elevating	kW (hp)	W: 4.6 × 2 (6.1 × 2)											
● Power Sources													
Electrical power supply	kVA	60*4											
Compressed air supply	L/min(ANR)	850 (0.5 MPa or more)*4											
● Machine Size													
Height	mm (in)	6,420 [6,620] (252.76 [260.63])			6,700 [6,900] (263.78 [271.65])								
Floor space (machine only)	mm (in)	7,370 × 10,730 (290.16 × 422.44)	7,370 × 12,830 (290.16 × 505.12)	7,370 × 16,430 (290.16 × 646.85)	7,870 × 12,830 (309.84 × 505.12)	7,870 × 16,430 (309.84 × 646.85)	7,870 × 19,430 (309.84 × 764.96)	7,870 × 23,930 (309.84 × 942.13)	8,340 × 12,830 (328.35 × 505.12)	8,340 × 16,430 (328.35 × 646.85)	8,340 × 19,430 (328.35 × 764.96)	8,340 × 23,930 (328.35 × 942.13)	8,340 × 27,930 (328.35 × 1,099.61)
Mass (machine only)*5	kg (lb)	46,000 (101,200)	52,000 (114,400)	60,000 (132,000)	58,000 (127,600)	67,000 (147,400)	80,000 (176,000)	88,000 (193,600)	65,000 (143,000)	75,000 (165,000)	89,000 (195,800)	99,000 (217,800)	113,000 (248,600)

[ ]: Optional
*1. [ ] Numbers when extension head length is 250 mm. *2. For die/mold kits . . . X, Y: 20, Z: 10 m/min. *3. Deceleration near both ends of Y-axis travel *4. Standard specs
*5. With 50-tool magazine, 2-station AAC

Dimensional Drawing



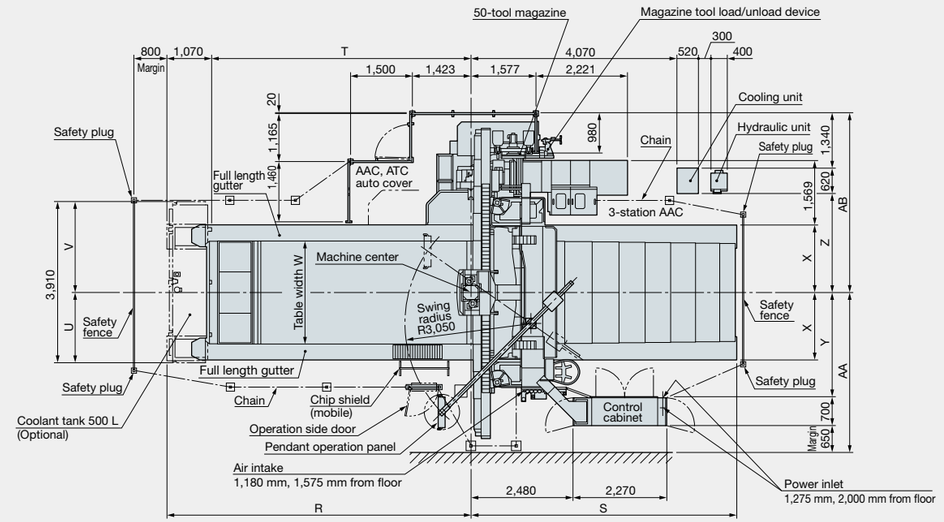
* Effective width between columns

Unit: mm

Size		A	B	C	D		E	F	G	H	J	K
					Z-axis travel 800 specs	Z-axis travel 1,000 specs						
25	25 × 40	2,650	4,200	3,200	800	1,000	1,000	10,730	4,400	1,650	3,260	7,370
	25 × 50		5,200					12,830	5,400			
	25 × 65		6,700					16,430	6,900			
30	30 × 50	3,150	5,200	3,700			1,200	12,830	5,400	1,850	3,510	7,870
	30 × 65		6,700					16,430	6,900			
	30 × 80		8,200					19,430	8,400			
	30 × 100		10,200					23,930	10,400			
35	35 × 50	3,650	5,200	4,200				12,830	5,400	1,800	3,730	8,340
	35 × 65		6,700					16,430	6,900			
	35 × 80		8,200					19,430	8,400			
	35 × 100		10,200					23,930	10,400			
	35 × 120		12,200					27,930	12,400			

Size		L		M		N	P	Q
		Z-axis travel 800 specs	Z-axis travel 1,000 specs	Z-axis travel 800 specs	Z-axis travel 1,000 specs			
25	25 × 40	5,690	5,890	6,420	6,620	3,700	850	3,650
	25 × 50							
	25 × 65							
30	30 × 50	5,940	6,140	6,700	6,900	3,950	900	4,025
	30 × 65							
	30 × 80							
	30 × 100							
35	35 × 50					4,200	950	
	35 × 65							
	35 × 80							
	35 × 100							
	35 × 120							

Installation Drawing



Unit: mm

Size		R	S	T	U	V	W	X	Y	Z	AA	AB
25	25 × 40	6,310	5,400	5,240	1,455	2,455	2,000	1,386	2,280	2,150	3,630	4,110
	25 × 50	7,360	6,450	6,290								
	25 × 65	9,160	8,250	8,090								
30	30 × 50	7,360	6,450	6,290	1,705	2,205	2,500	1,636	2,530	2,400	3,880	4,360
	30 × 65	9,160	8,250	8,090								
	30 × 80	10,660	9,750	9,590								
	30 × 100	12,910	12,000	11,840								
35	35 × 50	7,360	6,450	6,290	1,955	1,955	3,000	1,886	2,780	2,650	4,130	4,610
	35 × 65	9,160	8,250	8,090								
	35 × 80	10,660	9,750	9,590								
	35 × 100	12,910	12,000	11,840								
	35 × 120	14,910	14,000	13,840								

* Dimensions may change depending on specifications. Please refer to final delivered machine specifications.

MCR-BV

When using Okuma products, always read the safety precautions mentioned in the instruction manual and attached to the product.

● The specifications, illustrations, and descriptions in this brochure vary in different markets and are subject to change without notice.
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